

## **Module 3: Introduction to Database and Data Warehouse**

### **What are Keys?**

A DBMS key is an attribute or set of an attribute which helps you to identify a row(tuple) in a relation(table). They allow you to find the relation between two tables. Keys help you uniquely identify a row in a table by a combination of one or more columns in that table.

### **Why we need a Key?**

Here, are reasons for using Keys in the DBMS system.

- Keys help you to identify any row of data in a table. In a real-world application, a table could contain thousands of records. Moreover, the records could be duplicated. Keys ensure that you can uniquely identify a table record despite these challenges.
- Allows you to establish a relationship between and identify the relation between tables
- Help you to enforce identity and integrity in the relationship.

### **Various Keys in Database Management System**

DBMS has folwing seven types of Keys each have their different functionality:

- Super Key
- Primary Key
- Candidate Key
- Alternate Key
- Foreign Key
- Composite Key

### **What is the Super key?**

A super key is a group of single or multiple keys which identifies rows in a table. A Super key may have additional attributes that are not needed for unique identification.

### **Example:**

**EmpSSN**

**EmpNum**

**Empname**

9812345098	AB05	Shown
9876512345	AB06	Roslyn
199937890	AB07	James

In the above-given example, EmpSSN and EmpNum name are superkeys.

## What is a Primary Key?

A column or group of columns in a table which helps us to uniquely identifies every row in that table is called a primary key. This DBMS can't be a duplicate. The same value can't appear more than once in the table.

Rules for defining Primary key:

- Two rows can't have the same primary key value
- It must for every row to have a primary key value.
- The primary key field cannot be null.
- The value in a primary key column can never be modified or updated if any foreign key refers to that primary key.

### Example:

In the following example, `StudID` is a Primary Key.

StudID	Roll No	First Name	LastName	Email
1	11	Tom	Price	<a href="mailto:abc@gmail.com">abc@gmail.com</a>
2	12	Nick	Wright	<a href="mailto:xyz@gmail.com">xyz@gmail.com</a>
3	13	Dana	Natan	<a href="mailto:mno@yahoo.com">mno@yahoo.com</a>

## What is the Alternate key?

All the keys which are not primary key are called an alternate key. It is a candidate key which is currently not the primary key. However, A table may have single or multiple choices for the primary key.

Example: In this table.

StudID, Roll No, Email are qualified to become a primary key. But since StudID is the primary key, Roll No, Email becomes the alternative key.

StudID	Roll No	First Name	LastName	Email
1	11	Tom	Price	<a href="mailto:abc@gmail.com">abc@gmail.com</a>
2	12	Nick	Wright	<a href="mailto:xyz@gmail.com">xyz@gmail.com</a>
3	13	Dana	Natan	<a href="mailto:mno@yahoo.com">mno@yahoo.com</a>

## What is a Candidate Key?

A super key with no repeated attribute is called candidate key.

The Primary key should be selected from the candidate keys. Every table must have at least a single candidate key.

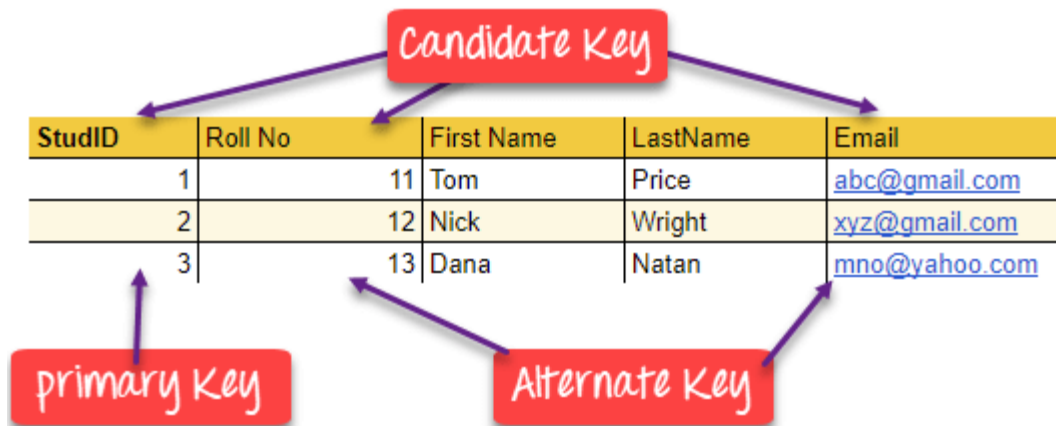
### Properties of Candidate key:

- It must contain unique values
- Candidate key may have multiple attributes
- Must not contain null values
- It should contain minimum fields to ensure uniqueness
- Uniquely identify each record in a table

Example: In the given table Stud ID, Roll No, and email are candidate keys which help us to uniquely identify the student record in the table.

StudID	Roll No	First Name	LastName	Email
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1	11	Tom	Price	<a href="mailto:abc@gmail.com">abc@gmail.com</a>
2	12	Nick	Wright	<a href="mailto:xyz@gmail.com">xyz@gmail.com</a>
3	13	Dana	Natan	<a href="mailto:mno@yahoo.com">mno@yahoo.com</a>



## What is the Foreign key?

A foreign key is a column which is added to create a relationship with another table. Foreign keys help us to maintain data integrity and also allows navigation between two different instances of an entity. Every relationship in the model needs to be supported by a foreign key.

### Example:

DeptCode	DeptName
001	Science
002	English
005	Computer

Teacher ID	Fname	Lname
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B002	David	Warner
B017	Sara	Joseph
B009	Mike	Brunton

In this example, we have two table, teach and department in a school. However, there is no way to see which search work in which department.

In this table, adding the foreign key in Deptcode to the Teacher name, we can create a relationship between the two tables.

Teacher ID	DeptCode	Fname	Lname
B002	002	David	Warner
B017	002	Sara	Joseph
B009	001	Mike	Brunton

This concept is also known as Referential Integrity.

### What is the Composite key?

A key which has multiple attributes to uniquely identify rows in a table is called a composite key. The difference between compound and the composite key is that any part of the compound key can be a foreign key, but the composite key may or maybe not a part of the foreign key.